

What is claimed is:

1. A power supply system comprising:
 - a first path configured to be coupled to a first battery;
 - a second path configured to be coupled to a second battery, said first path and said second path coupled to a common node;
 - a first switch and a second switch coupled to said first path and configured to allow selective coupling of said first battery to a load for discharging said first battery;
 - a third switch and a fourth switch coupled to said second path and configured to allow selective coupling of said second battery to said load for discharging said second battery; and
 - a selector circuit configured to close said first, second, third, and fourth switch to allow discharging of said first battery and said second battery in parallel if a first discharge current level from said first battery is greater than a first discharge threshold level and a second discharge current level from said second battery is greater than a second discharge threshold level.
2. The power supply system of claim 1, wherein said first discharge threshold level is equal to said second discharge threshold level.
3. The power supply system of claim 1,

wherein said first switch and second switch are further configured to allow selective coupling of said first battery to a DC power source for charging said first battery;

wherein said third switch and said fourth switch are further configured to allow selective coupling of said second battery to said DC power source for charging said second battery; and

wherein said selector circuit is further configured to close said first, second, third, and fourth switch to allow charging of said first battery and said second battery in parallel if a first charge current level to said first battery from said DC power source is greater than a first charge threshold level and a second charge current level to said second battery from said DC power source is greater than a second charge threshold level.

4. The power supply system of claim 3, wherein said first charge threshold level is equal to said second charge threshold level.

5. The power supply system of claim 1, further comprising a first diode in parallel with said first switch, a second diode in parallel with said second switch, a third diode in parallel with said third switch, and a fourth diode in parallel with said fourth switch.

6. The power supply system of claim 3, further comprising a first diode in parallel with said first switch, a second diode in parallel with said second switch, a third diode in parallel with said third switch, a fourth diode in parallel with said fourth switch.

7. The power supply system of claim 5, wherein said first diode is in reverse bias with said second battery and said selector circuit is further configured to open said first switch and close said second switch if said first discharge current level is less than said first discharge threshold level.

8. The power supply system of claim 6, wherein said second diode is in reverse bias with said first battery and said selector circuit is further configured to open said second switch and close said first switch if said first charge current level is less than said first charge threshold level.

9. The power supply system of claim 7, wherein said third diode is in reverse bias with said first battery and said selector circuit is further configured to open said third switch and close said fourth switch if said second discharge current level is less than said second discharge threshold level.

10. The power supply system of claim 8, wherein said fourth diode is in reverse bias with said second battery and said selector circuit is further

configured to open said fourth switch and close said third switch if said second charge current level is less than said second charge threshold level.

11. An electronic device comprising:

- a first path configured to be coupled to a first battery;
- a second path configured to be coupled to a second battery, said first path and said second path coupled to a common node;
- a first switch and a second switch coupled to said first path and configured to allow selective coupling of said first battery to a system of said electronic device for discharging said first battery;
- a third switch and a fourth switch coupled to said second path and configured to allow selective coupling of said second battery to said system for discharging said second battery; and
- a selector circuit configured to close said first, second, third, and fourth switch to allow discharging of said first battery and said second battery in parallel if a first discharge current level from said first battery is greater than a first discharge threshold level and a second discharge current level from said second battery is greater than a second discharge threshold level.

12. The electronic device of claim 11, wherein said first discharge threshold level is equal to said second discharge threshold level.

13. The electronic device of claim 11,
wherein said first switch and second switch are further configured to allow selective coupling of said first battery to a DC power source for charging said first battery;
wherein said third switch and said fourth switch are further configured to allow selective coupling of said second battery to said DC power source for charging said second battery; and
wherein said selector circuit is further configured to close said first, second, third, and fourth switch to allow charging of said first battery and said second battery in parallel if a first charge current level to said first battery from said DC power source is greater than a first charge threshold level and a second charge current level to said second battery from said DC power source is greater than a second charge threshold level.

14. The electronic device of claim 13, wherein said first charge threshold level is equal to said second charge threshold level.

15. The electronic device of claim 11, further comprising a first diode in parallel with said first switch, a second diode in parallel with said second switch, a third diode in parallel with said third switch, and a fourth diode in parallel with said fourth switch.

16. The electronic device of claim 13, further comprising a first diode in parallel with said first switch, a second diode in parallel with said second switch, a third diode in parallel with said third switch, a fourth diode in parallel with said fourth switch.

17. The electronic device of claim 15, wherein said first diode is in reverse bias with said second battery and said selector circuit is further configured to open said first switch and close said second switch if said first discharge current level is less than said first discharge threshold level.

18. The electronic device of claim 16, wherein said second diode is in reverse bias with said first battery and said selector circuit is further configured to open said second switch and close said first switch if said first charge current level is less than said first charge threshold level.

19. The electronic device of claim 17, wherein said third diode is in reverse bias with said first battery and said selector circuit is further configured to open said third switch and close said fourth switch if said second discharge current level is less than said second discharge threshold level.

20. The electronic device of claim 18, wherein said fourth diode is in reverse bias with said second battery and said selector circuit is further

configured to open said fourth switch and close said third switch if said second charge current level is less than said second charge threshold level.

21. A method of ensuring safe operation of batteries in parallel, said method comprising:

receiving a control signal from an associated power management unit representative of a desired parallel coupling of at least a first battery and a second battery to a common node;

receiving a first current signal representative of a first current level along a first path coupled between said first battery and said common node;

receiving a second current signal representative of a second current level along a second path coupled between said second battery and said common node;

comparing said first current signal to a first threshold current level and said second current signal to a second threshold current level; and

coupling said first battery and second battery in parallel to said common node if said first current signal is greater than said first threshold current level and said second current signal is greater than said second threshold current level.

22. The method of claim 21, further comprising:

preventing discharge current flow from said first battery to said second battery if said second current signal is less than said second threshold current level.

23. The method of claim 21, further comprising:

preventing charging current flow from said first battery to said second battery if said first current signal is less than said first threshold current level.